MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2017/2018

TCP1101 – PROGRAMMING FUNDAMENTALS

(All sections / Groups)

11 OCTOBER 2017
2.30 p.m - 4.30 p.m
(2 Hours)

Question	Marks
1	
2	
3	
4	
Total	

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 11 pages with 4 Questions only.

2. Attempt **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please write all your answers in this Question paper.

Question 1

Unless otherwise stated, every code segment provided in every question below is contained within a `main()` function, complete with the directive `#include <iostream>`, `#include <vector>`, and the statements `using namespace std;` and `return 0;`
Write the output as the result of execution of the following code segments. [10 marks]

(a)

```
int a = 3, b = 1;
float c = 2.5;

cout << 2 * b * 3 + ( c - a ) + 4 ;
```

(b)

```
int a = 5, b = 7, c = 2;

cout<< c << "  " << a << "  " << b <<endl;

a = 1 * a + b;
c = 4 - a / c;

cout<< c << "  " << a <<"   "<< b << endl;
```

(c)

```
int x = 4, y = 1;

do
{
     cout<< x <<endl;

     x += 2;

     y += x;

} while (x < 9);

cout<< y - 8;
```

(d)

```
int a = 9, b = 4;

a++;
while (b < a){

     a = b - 8 + 1;

     cout<< a <<"  "<< b <<endl;

     b++;
}
```

(e)

```
int x = 9, y = 9, z = 4;

if ((x && y) || (y && z))
   x = 3;
else
   z = 8;
```

Continued .....

```
cout<< x <<"  "<< y <<"  "<< z ;
```

(f)

```
int a[2] = {4, 9};
int b[9] = {3, 7, 9, 1, 1, 9, 3, 5, 3};

int answer = 5 - a[1] / 7 * b[5];

cout<< answer + 3;
```

(g)

```
int a = 5, b = 1, c = 8;

for (a = 3; b <= 2; b++)
{
     c = a + 2 - b * c;

     cout<< c <<endl;
}
 cout<< b;
```

(h)

```
#include <iostream>
#include <string>
using namespace std;

class Student{
private:
     int age;
     string name;

public:
    Student();
    void display();
    void set_data(int x, string n);
};

Student::Student(){
    name = "Ahmad";
    age = 10;
}

void Student::set_data(int x, string n){
    name = n;
    age = x;
}

void Student::display(){
    cout << name << " " << age;
}

int main()
{
   Student A;
   A.set_data(25, "Ali");
   A.display();
   return 0;
}
```

Continued .....

(i)

```
int fun(int &x, int y)
{
    x = 3 - x;
    y = y * 1;
    return (x / y);
}
int main( )
{
    int i = 1, j = 3;
    int answer = fun(i, j);

    cout<< answer * (2 / j);

    return 0;
}
```

(j)

```
int x = 7, y = 9, z = 6;

int *ptr1 = &x;
int *ptr2 = &z;
int *ptr3 = &z;

ptr1 = ptr3;
ptr3 = ptr2;
*ptr2 = *ptr1;

*ptr3 = 6;

cout<< x + *ptr2 + *ptr3;
```

Continued .....

Question 2

Unless stated otherwise, assume the user always enters a valid input and user input error checking is not needed.

(a) What is a compiler?

[1 mark]

(b) Write a program which asks the user to enter an integer and decides whether it is between 10 and 20.

Sample Run 1
```
Enter an integer : 20
It is within range.
```

Sample Run 2
```
Enter an integer : 15
It is within range.
```

Sample Run 3
```
Enter an integer : 5
It is out of range.
```

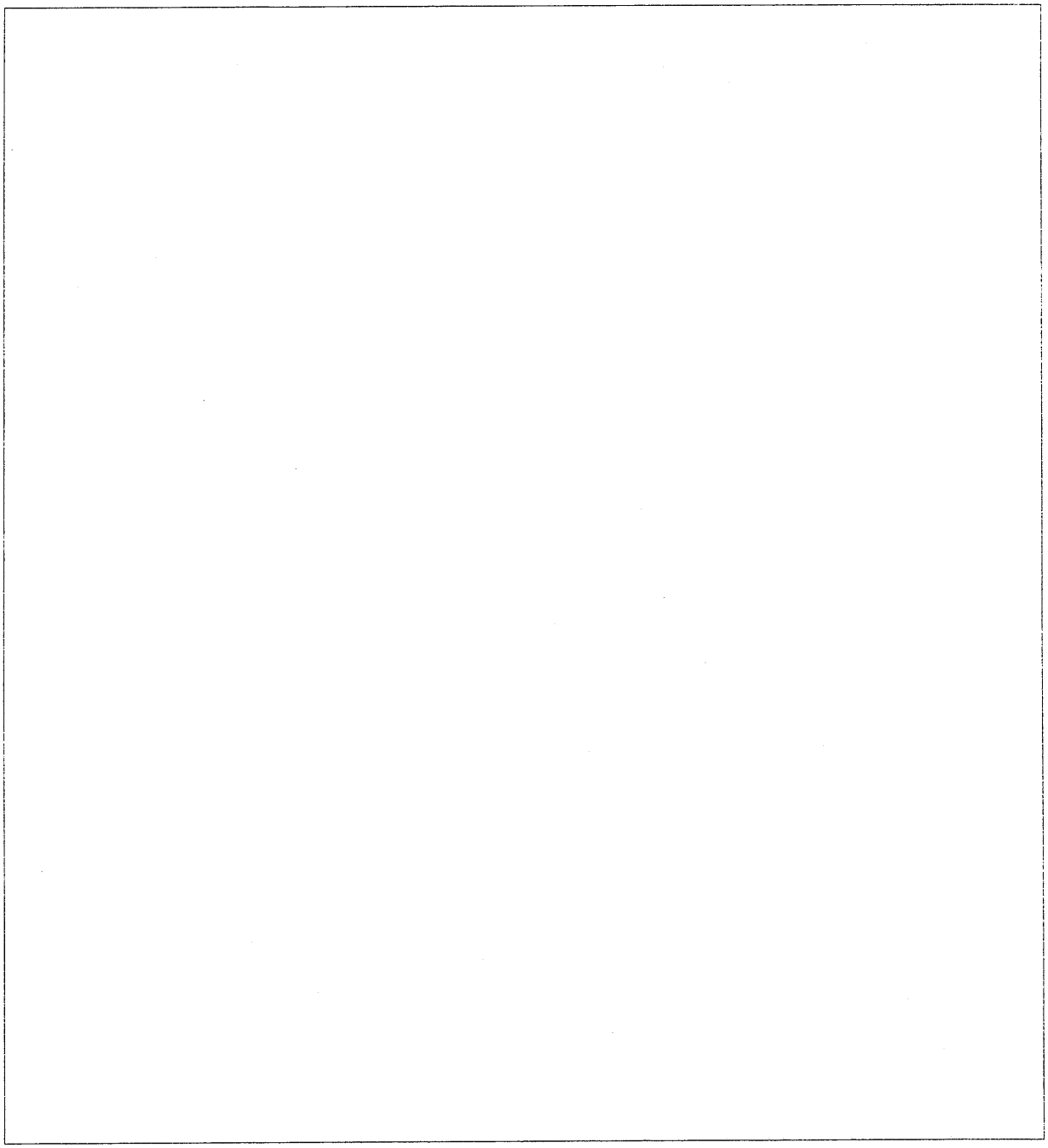
[2 marks]

Continued .....

(c) Draw a flowchart to display n number of Fibonacci numbers where n is entered by the user.

e.g. n = 7→ 1 1 2 3 5 8 13
n = 3→ 1 1 2
n = 1→ 1

[4 marks]



Continued .....

(d) Complete the following program which reverses the sequence of four variables. Do not use predefined functions in your code.

Sample Run 1
```
Enter four text strings: s1 s2 s3 s4
s4 s3 s2 s1
```

Sample Run 1
```
Enter four text strings: AAA BBB CCC DDD
DDD CCC BBB AAA
```

[3 marks]

```
#include <iostream>
using namespace std;

void reverseFour( string& a, string& b, string& c, string& d
);

int main()
{
     string a, b, c, d;

     cout <<"Enter four text strings: ";
     cin >> a >> b >> c >> d;

     reverseFour( a, b, c, d );

     cout << a <<""<< b <<""<< c <<""<< d;
     cout << endl;

     return 0;
}

// Write your code from here
void reverseFour( string& a, string& b, string& c, string& d )
{
```

Continued .....

```
}
// Write your code until here
```

Question 3

(a) A scientist is conducting an experiment each day. Every experiment may generate a maximum of 5000 readings or less, where each reading is a positive integer number. She has created an array to store each day's readings. Since each experiment may not fill up all the 5000 elements of the array, she fills up all the unused elements with a number **-9**. Below shows an example of data collected in any given day:

```
int readings[5000] = {95, 7, 42, 73, ......, 26, -9, -9,
......, -9};
```

You are required to write a loop to calculate the total of all the readings in a day NOT including the special number **-9**.

[2.5 marks]

(b) Differentiate between Call-by-reference and Call-by-value. [2 marks]

Continued .....

(c) Write the output as the result of execution of the following program. [2.5 marks]

```
#include <iostream>
using namespace std;

void func(int & a, int & b){
   int temp;
   temp = a;
   a = b;
   b = temp;
}

int main(){
   int value = 2, list[4] = {0,1,2,3};
   func(value, list[0]);
   func(list[0], list[1]);
   func(value, list[value]);

   cout << value << endl;

   for(int i = 0; i < 4; i++)
   cout << list[i] << ", ";

   return 0;
}
```

(d) Write a function named **grading** that accepts an input mark (type double) and returns the grade (type char). The grading system is: F for 0 to below 50; D for 50 to below 60; C for 60 to below 70; B for 70 to below 80; and A for 80 to 100. The function should returns 'Z' if the mark is not in the range within 0 and 100.

[3 marks]

Continued .....

Question 4

(a) Write the definition for a void function called `to_screen`. The function `to_screen` has one formal parameter called `input_file_stream`, which is of type `ifstream&`. This function does not close the file. The precondition and postcondition for the function are as follows:

- Precondition: The stream `input_file_stream` has been connected to a file with a call to the member function open. The file contains a list of integers and nothing else.
- Postcondition: The numbers in the file connected to `input_file_stream` have been written to the computer screen one per line.

[4 marks]

(b) The following program contains an error in how the pointers are handled. Identify the line number of the program that causes the error. Describe the error. Then, provide a correction to resolve the error. Line numbers are provided on the right-hand-side. [3 marks]

```
#include <iostream>                  // Line 1
using namespace std;                 // Line 2
int main(int argc, char* argv[])     // Line 3
{                                    // Line 4
    int* x;                          // Line 5
    int* y;                          // Line 6
                                     // Line 7
    *y = 12;                         // Line 8
    y = x;                           // Line 9
}                                    // Line 10
```

Continued .....

(c) Write a function declaration and a function definition for the function named `in_order` that takes three pointer arguments of type integer to complete the program below. The function returns true if the three arguments are in ascending order; otherwise, it returns false. For examples, `in_order(1, 2, 3)` and `in_order(1, 2, 2)` both return true, while `in_order(1, 3, 2)` returns false. [3 marks]

```
#include <iostream>
using namespace std;

// Write your function declaration code from here

// End your code here

int main(int argc, char* argv[])
{
    int a = 1, b = 2, c = 3;
    int *p1 = &a, *p2 = &b, *p3 = &c;

    cout << boolalpha << in_order(p1, p2, p3);

    return 0;
}

// Write your function definition code from here

// End your code here
```

End of Question.